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Two very general matters may be mentioned in conclusion. First, up to recently it has been generally held that the method of silver impregnation depended solely on a deposit of metal in lymph-spaces, to this Waldeyer adds a possible staining of certain elements which if it means anything means that the reaction takes place within the substance stained and not around it. Second, Kölliker in discussing this subject has laid great stress on the question how far the fibres brought out represent those which are modulated and how far those which are non-modulated. On this point Waldeyer has nothing to say.

OBERSTEINER, *Anleitung beim Studium der Baues der nervösen Centralorgane im gesunden und kranken Zustand*, 2. Aufl., Leipzig 1892.

The first edition of this admirable work was received with general rejoicings and was, at the time, reviewed in these columns. (AM. JOUR. OF PSYCHOLOGY, Vol. II, No. 2, Feb. 1889.) Since then (1890) it has undergone translation at the hands of Dr. Alex. Hill, of Downing College, Cambridge, England. The translation is good and the English edition differs from the original German in containing certain addenda, (always bracketed in the text), in which, for the most part, the translator presents some morphological views of his own. We do not propose to attempt here more than to point out some features of the second German edition as compared with the first. The fundamental character and arrangement are unchanged; as the author tells us in the preface, the text has been carefully worked over. The result is about one hundred pages more of reading matter and several new cuts.

A first-class book of this kind is in some sense a work of art and as such must have its sketchy portions. At the same time it is sure to be judged by what is best in it which, in this case, is the anatomical matter—in the stricter sense of the term. Where the evidence for views is physiological or developmental, the author's critical sense is less helpful to the reader. We have said that the book has grown and that in parts it is sketchy; it is to be devoutly hoped that it may remain so and stop growing. Even in this second edition there are introduced new things, presumably for the sake of completeness, which weaken its character as a critical essay. It seems the fate of many strong books to thus undergo in later editions a form of fatty degeneration where bulk is gained and tone is lost, and the perspective of the subject is damaged. Turning now to details, several matters call for notice.

The section on methods is fuller and more accurate than before. Take it all in all this chapter forms the best manual on the histological methods for the nervous system that we have. In discussing the method of degeneration it does not appear why Schwalbe's hypothetical nerve fibre with two nutritive centres should be introduced. It represents a purely formal difficulty. The development of the central nervous system is just touched upon and histogenesis is hardly mentioned. In the chapter in morphology Fig. 20 is not without fault. The lateral plexus appears to be cut off from the rest of the velum and the stria cornea is represented on one side only.

In considering the fissuration of the hemispheres the author holds closely to Ecker. Eberstaller's contributions to the subject are recognized in the text and we should be glad to see his boundaries for the occipital lobe accepted in the figures. These figures (24-27) can certainly be improved. The central fissure should cut the mantel-edge and the relations of the interparietal sulcus and parieto-occipital fissure in Fig. 24 are quite misleading. The parieto-occipital fissure normally cuts the mantel-edge much in front of the point at which it is indicated. And furthermore the figures do not agree among themselves in representing this relation.

At birth the fissuration in the normal brain is usually almost complete, only the tertiary sulci being in part undeveloped and the statement that "the principal fissures are present," leaves the completeness quite unemphasized; for the erroneous idea that the fissuration of the hemispheres at birth was still far from finished, Ecker is mainly responsible.

In alluding to localization in the cortex Obersteiner falls back on Exner's view that they are foci without sharp limits. However true this may be for the lower mammalia, the recent work on man and the higher monkeys points to a sharper limitation in these higher forms, so far, at least, as the motor centres are concerned. The law given for the relation of the thickness of the cortex to the size of the gyri, according to which the larger gyri have the thicker cortex, certainly does not include the insula, for there the gyri, however considered, are of moderate size though the cortex is the thickest. Further, deep sulci are found in the occipital region where the cortex is thin, and gyri with broad tops, though bounded by shallow sulci, are found on the orbital surface where the cortex is equally thin. The large gyri in this connection must therefore have both broad tops and deep sulci bounding them in order to present the thicker cortex.

In discussing brain weight, if the figures are taken from Bischoff, as they appear to be, the average weight for the female brain should be 1220 grms. instead of 1230 grms. as printed. It should further be made clear that these mean weights are obtained from brains still enclosed in the leptomeninges.

Direct evidence given by Topinard, Bischoff, Boyd and others indicates that some brain growth takes place up to thirty-years in females, while in males it may continue nearly ten years longer. This fact is hardly suggested by the statement that towards the twentieth year the maximum brain weight is attained. In presenting Wagner's figures for the superficial extent of the cortex it should be stated that the measurements were made on brains shrunken by alcohol and that while the specimens of Wagner's series are comparable among themselves, his figures do not without correction form a basis for determining the extent of the cortex in the fresh brain.

It is agreeable to find the question of the difference in the weight of the two hemispheres of the brain properly neglected. There is no doubt that some brains have one hemisphere larger than the other. There is equally little doubt that the differences usually found depend on the difficulty of dividing the brain fairly and that these difficulties, arising from the distortion of the specimen and the constant error of the operator—who cannot possibly divide even a favorable object into two equal portions,—give rise to those inequalities which have so often been treated as important, but which in reality lie well within the limit of the errors of observation. The results of Obersteiner's own careful observations on the specific gravity of different portions of the brain form the last topic discussed in this chapter on the morphology. In taking up the histological elements of the nervous system the author states the fibrilla and hyaloplasma theories of the structure of the axis-cylinder without attempting to decide between them. While considering the axis-cylinder as continuous he decides, on the strength of Jacobi's results, against the discontinuity of the sheath of Schwann, as advocated by Boveri. In man he claims a considerable degeneration of fibres on the central side of lesions occurring in a peripheral nerve,—adding that this degeneration is less marked in animals. Further a normal degeneration of peripheral nerves in man, implying a degeneration of the cells connected with them, is asserted. Such an idea surely needs more evidence for its support than can at present be furnished. In discussing the nerve-cell he adheres to the older views. The absence of chromatin

from the nucleus of the nerve cell is noted and the cell outgrowths discussed with special reference to the axis-cylinder prolongation as demonstrated by Golgi's method. The author seems to us unduly skeptical on this particular point, though his arguments against the simple nutritious functions of the protoplasmic prolongations have more force. Our principle indictments against this chapter is that he still speaks of nerve-cells and fibres as separate elements, thus failing to utilize the valuable conception of the cell and its fibres as forming both a morphological and physiological unit.

Beginning with the spinal cord we come to the most valuable portions of the book. Here Cajal's results are freely used. The view that the columns of Goll are pathways for the muscle sense is supported by the observation that these columns are poorly developed in the limbless forms. The segmental nature of the spinal cord is passed over on the ground that it is but faintly indicated in the higher mammals—not a very sufficient reason.

In discussing the spinal nerves their double origin—from both sides of the cord—is described and this idea is carried over to the cranial nerves where even the patheticus and abducens are forced into the schema. One cannot help feeling in the light of v. Guddins's results, that the weight of evidence is against such a view. The new figures (134-136) in the section on the medulla and interbrain form welcome illustrations of the latter region. If an argument were needed to show how much the histologist had yet to do on the nerve centres, no better one could be offered than the fact that the olfactory bulb and tract are here illustrated and considered from the examination of them in the dog. The contribution of His to the make up of the olfactory bulb is not mentioned and the double nature of the optic nerve is passed over. Farther on, the anatomical myth about the fibres of the Callosum joining identical points of the cortex appears. This is pure hypothesis and should not be presented as anything else.

Finally, the pictures illustrating the cortex (p. 445) are all out of drawing. The size of the cells and the relative thickness of the several layers are both calculated to give wrong impressions, which are only in part to be corrected by the figure on p. 451 illustrating the distinction of fibres in the cortex.

References to the more important literature have been introduced at the end of each section and in many cases the abbreviations used in connection with the figures have been arranged in alphabetical order in the explanation, thus facilitating reference. The foregoing remarks are intended simply as a running comment to the thanks due the author from those who have occasion to use his lucid and instructive book.

TURNER, *The convolutions of the brain; a study in comparative anatomy*, Jour. of Anat. and Physiol., 1890-1, XXV, 105, also *Verhandlungen des X. internationalen medicinischen Congresses, Berlin 1890*, II. Berlin 1891.

This paper is valuable for the simple and novel form in which it presents the comparative anatomy of the gyri. Lacking, as we do, a really adequate theory of the formation of the gyri from the physiological side, it is necessary to come back to the comparative anatomy for the significance of these foldings; from this latter standpoint our author reviews the field.

He makes departure from the very general fact that a cerebral hemisphere is separable into two natural divisions—a ventral portion, or Rhinencephalon, and a dorsal portion, or Pallium. These main divisions are separated by the rhinal or ecto-rhinal fissure.

So far as the rhinencephalon is concerned Turner follows Broca in making it the basis for a further grouping. Instead of Broca's two